

Multi-Stage Fans

- Shaft & bearings
- Rotor/Stator interaction noise reduction
- Multistage model
- Fan Noise ANC
- Jet noise reduction

Variable Cycle

- Smart materials for variable geometry components
- Reliable/low-cost actuators
- Variable geometry
 - fan pitch
 - stator
 - inlet
 - nozzle

Dual Fan

- Advanced, light-weight gearbox
- Thrust reversing
- Variable pitch
- Nacelle drag reduction
- PAI
- Operability

Pneumatic Control

- Bleed flow
- Exhaust control
- Flow design issue
- Materials
- Engine out (safety)
- *Also an airframe issue*

Active Blowing/Suction

- Flow management Fan/Nacelle/jet
- MEMS
- Fluidics
- Fail safe reliability controls
- Bleed air availability
- Micro jets

Combustor/Turbine

- High temp. acoustic liner
- Flow modeling & prediction
- Active noise control
- PAI
- Advanced diagnostic methods
- Baseline
- Turbulence/wake
- source diagnostic experiments (core)
- Facilities

Active Jet Noise Control

- Actuators
- High temperature
- Modeling of non-round jets
- Fundamental jet noise modeling
- CAA
- Turbulence structure control
- jet instability wave control

Mini-Nozzles (Distributed Exhaust)

- High-temperature/-erosion resistance nozzle materials
- Performance improvement for distributed exhaust
- CFD/CAA
- Application to bypass engines
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Turbulence Control

- Ionization
- See other lists

Linear Accelerator

- Light-weight accelerator
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Seeding Exhaust

- Fluid injection
- Seeding subsystem
- Could effect emissions
- Biased flow nacelle
- low weight exhaust seeding

Counter-rotating Fan

- See multi-stage fan
- Ducted & unducted
- Low speed fans

Advanced Liners

- Biased flow nacelle
- Modular, variable impedance liners
- Active control
- Light weight
- Micro blowing liner
- Advanced facilities
- High temperature
- Durability
- Modelling

Adaptive Nacelle

- Smart materials
- Active noise control
- reliability, maintainability
- Variable inlet & duct geometry
- Variable cycle

UHB Ducted Propellor

- Statorless fan technology
- Advanced ADP
- Strut design
- Aerodynamic performance
- Operability
- Variable pitch
- High wing aircraft

Micro-engines

Variable Camber/Adaptive Surface Wing

- Smart materials/structure for adaptive wing
- Actuation
- Digital control systems
- Dynamic load alleviation
- CAA
- PAI
- Safety

Blended Wing Body

- Composites
- PAI
- Buried engine
- Airport integration
- Active vibration control

“Landing Gear Noise”

- Delayed deployment
- CAA
- Flow/acoustic control
- Porous shroud
- Gearless design
- Gear/flap interaction

Strut Braced Wing (High Aspect Ratio)

- Structural design
- Composites
- trailing edge noise

Pneumatic Control/Circulation Control

- Engine/wing integration for high lift
- Bleed flow
- Exhaust control
- Flow design issue
- Materials
- Engine out safety
- *Also an engine issue*

Buried Engine

- PAI
- Structural/vibration control
- Lifting nacelle
- engine Inflow distortion management
- Containment
- Maintainability, service-ability

Turbulence Control

- Laminar flow
- Boundary layer blowing/suction
- Optimized surface treatment to control turbulence
- Microblowing
- MEMS
- Mini-transducers
- Shape optimization
- CFD: First principles turb model

Far Field Active Noise Control

- Actuators
- Signal processing
- Sensor/actuators technology

Strut Braced Wing (High Aspect Ratio)
Buried Engine

“Landing Gear Noise”

Turbulence Control

Variable Camber/Adaptive Surface Wing

Far Field Active Noise Control

Blended Wing Body

Pneumatic Control/Circulation Control